Response to Amendment/Arguments

1. This action is in response to amendment filed 02/23/08, which has been entered.

2. Claims 1-21 are still pending.

3. Applicant's amendment has rendered moot the 35 USC 103 rejections of claims 1-21. However, upon further consideration, a new ground(s) of rejection is made in view of Fioravanti et al. (US 2002/0123860). See below.

4. Applicant alleged that the reasons set forth in the Office action fail to articulate each of the Graham factual inquiries. (See pp. 7-8 of the response.) The examiner disagrees and directs Applicant's attention to the 35 USC 103 rejections using Kato and Lee references. In particular, Applicant argues that there is no need to use motion sensors in Kato's system because it has the means for determining motion information. However, the problem to be solved by Kato is how to effectively determine the motion vectors. While Kato uses one means to measure the motion of the camera, it does not preclude one of ordinary skill in the art to use a different means as the motion sensors taught by Lee to allow the camera to be mounted in different platforms (and therefore be able to be used in more applications). Therefore the argument is not persuasive.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-13 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (US 6,259,816), and further in view of Lee (US 2003/0058347) (both previously cited) and Fioravanti et al. (US 2002/0123860).

7. Regarding claim 1, Kato discloses

- an imaging subsystem for capturing video frames
[Ref. 11 of Figs. 1 & 7]
- encoding logic for encoding video flames from said imaging subsystem according to a motion compensation compression algorithm, wherein said encoding logic determines motion vectors by displacing interframe search areas using information from said motion sensor
[Fig. 1, refs. 13 & 14 (together considered as the encoding logic with detail of ref. 13 shown in Fig. 7, ref. 131); Fig. 5 (displacement of search area); Fig. 7 (motion-compensated compression); Col. 3, lines 49-56; Col. 5, lines 1-12]

Kato does not expressly disclose the following, which are taught by Lee and Fioravanti:

- a motion sensor for detecting movement of said device
[Lee: Fig. 18, “camera movement sensing means;” Paragraphs 36 (especially last 8 lines), 38 (especially the last 5 lines), 39 (describing various camera movements that can be detected) and 61]

- at least two accelerometers disposed on opposite ends of a single wall to detect translation along an axis normal to a Cartesian plane containing the accelerometers; and
  an adder coupled the accelerometers to sum a signal from one of the accelerometers with the inverse of a signal from the other of the accelerometers to generate a differential signal, the differential signal enabling detection of a change in angular orientation
  [Fioravanti: Fig. 2, ref. 138 (accelerometers); paragraph 27, especially the equation. Note that it is necessary to have an adder as set forth above to compute d2-d1 (with d2 being one signal and –d1 being the inverse of the other)]

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify Kato with the teachings of Lee and Fioravanti as recited above to obtain the invention as specified in claim 1. The reasons at least would have been to be able to provide camera movement information to the encoder to improve the possibility of finding the motion vectors (see Col. 4, lines 8-25 of Kato and paragraph 27 of Fioravanti) when the camera is mounted in a different platform (such as the one shown in Fig. 3 of Lee) in order to be able to use the camera in more applications.

8. Regarding claim 2, and similarly claim 19, Lee further discloses

- wherein said motion sensor generates information indicative of angular translation
  [Fig. 3; paragraph 39, lines 4 (pan and tilt are both angular movement)]

9. Regarding claim 3, and similarly claim 18, Lee further discloses

- wherein said motion sensor generates information indicative of linear displacement
  [Fig. 3 (camera motion, including rotations and linear translations); Fig. 17 (various state signals, including camera movement); Fig. 18, “camera movement sensing means;” P. 3, paragraph 39; PP. 6-7, paragraph 61]

10. Regarding claim 4, and similarly claim 20, Kato further discloses

- wherein said encoding logic implements a function that calculates an estimated interframe pixel displacement using information generated by said motion sensor [Fig. 1, refs. 13 & 14 (the encoding logic); Fig. 5 (displaced search area); Col. 5, lines 1-4]

11. Regarding claim 5, Kato further discloses

- wherein said function is a linear function
[Fig. 5 and Col. 5, lines 1-4. Note that the displacement as shown is linear]

12. Regarding claims 6 and 7, Kato discloses all limitations of its parent, claim 4. In addition, official notice is taken that implementation of encoding logic in either ASIC (claim 6) or software instruction (claim 7) are both well known in the art, the former would usually be for improved speed and the latter for flexibility and ease of modification; the selection of either would clearly have been a design choice since both can accomplish the task of encoding the images.

13. Regarding claim 8, the combined invention of Kato, Lee and Fioravanti discloses

- receiving at least first and second video frames
[Kato: Ref. 11 of Figs. 1 & 7]
- receiving motion information related to a movement of said device from at least one motion sensor
[Lee: Fig. 18; paragraph 61]
- selecting a reference block of pixels within said second frame
[Kato: Fig. 5, ref. P3 (reference block)]
- selecting a search area within said first frame, wherein said search area is displaced from a position defined by said selected reference block using said motion information
[Kato: Fig. 4; Fig. 5, ref. “Next search area;” Col. 5, lines 1-12]
- determining an interframe motion vector by comparing said reference block of pixels within said second frame to pixels within said search area of said first frame

[Kato: Fig. 5; Col. 5, lines 5-12]

- generating a differential signal; and
  detecting a change in angular orientation based on the differential signal
  [Fioravanti: Fig. 2, ref. 138 (accelerometers); paragraph 27, especially the equation]

14. Regarding claim 9, Kato further discloses

- determining a displacement vector from said motion information and originating at a position in said first frame associated with said reference block's position in said second frame, wherein said selecting said search area employs said displacement vector to locate said search area
  [Fig. 5; Col. 5, lines 1-12]

15. Regarding claims 10, 12, 13 and 17, Lee further discloses using a gyroscopic sensor (claim 10) or an accelerometer (claims 12, 13 and 17) to detect camera motion [P. 3, paragraph 38, especially the last 4 lines] for accuracy as well as to be able to operate in door (which GPS-based systems sometimes fail). Note that the operating principle of the accelerometer recited in claim 13 is well known in the art.

16. Regarding claim 11, Kato further discloses

- calculating a displacement vector by employing a small angle approximation for a function that receives information indicative of angular displacement using said gyroscopic sensor
  [Fig. 4 (angular displacement); Fig. 5, “Motion Vector” (the motion vector is shown as a displacement vector) and Col. 5, lines 1-4. Note that approximating a small angular displacement as a linear approximation to simplify the computation is well known to one of ordinary skill in the art]

17. Regarding claim 16, per the analysis of claim 1 the combined invention of Kato, Lee and Fioravanti discloses the means for generating, detecting and encoding. Additionally, Kato further discloses a means for interspersing intracoded frames as set

forth in the claim [Fig. 1, ref. 13; Fig. 7; Col. 5, lines 46-67. Note that Standard ITU-T H.261 intersperses I frames (i.e., intracoded frames) periodically. In this way the errors in predictive frames (P-frames) cannot be propagated/aggregated indefinitely thereby the noise is reduced.

18. Regarding claim 21, per the analysis of claim 1 the combined invention of Kato, Lee and Fioravanti discloses the steps of generating, detecting and encoding. Additionally, Official notice is taken that it is well known in the art that a small angular displacement can be approximated by a (linear) translation, therefore pixel translation can be estimated as a multiple of change in angular orientation detected using the accelerometers of Fioravanti [Fig. 2, ref. 138; paragraph 27].

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19. Claims 14 and 15 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kato (US 6,259,816), Lee (US 2003/0058347) and Fioravanti et al. (US 2002/0123860) as applied to claims 1-13 and 16-21 above, and further in view of (previously cited) Allen (US 2003/0058347).

20. Regarding claims 14 and 15, the combined invention of Kato, Lee and Fioravanti discloses all limitations of their parent, claim 12.

The combined invention of Kato, Lee and Fioravanti does not disclose the following, which is taught by Allen:

(claim 14) wherein a plurality of accelerometers generate said motion information, wherein said plurality of accelerometers provide at least one differential signal that is indicative of angular translation of said image capture device [Fig. 2, refs. 34-38 and Col. 4, line 59-Col. 5, line 7]

(claim 15) wherein a plurality of accelerometers are disposed within said image capture device in respective Cartesian planes [Fig. 2, refs. 34-38 and Col. 4, line 59-Col. 5, line 7]

The combined invention of Kato, Lee and Fioravanti is combinable with Allen because they both have aspects that are from the same field of endeavor of image compression.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Kato, Lee and Fioravanti with the teachings of Allen as recited above to obtain the inventions as specified in claims 14 and 15. The reasons at least would have been to stabilize the recorded scenes as well as to predict the frame-to-frame global motion as a precursor to video compression, as Allen indicates in Col. 3, lines 32-35.

Conclusion and Contact Information

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Kirkland et al. (US 2004/0064252) – discloses using multiple accelerometers to measure translation and rotation [refs. 110-114 of Figs. 1 & 2; paragraph 23]

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

23. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUBIN HUNG whose telephone number is (571)272-7451. The examiner can normally be reached on 7:30 - 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Matthew C. Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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